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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/760,704	01/17/2001	HiroYuki Nakano	501.39474X00	5851

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EXAMINER

SEVER, ANDREW T

ART UNIT	PAPER NUMBER
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2851

DATE MAILED: 04/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/760,704

Applicant(s)

NAKANO ET AL.

Examiner

Andrew T Sever

Art Unit

2851

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 03 April 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The corrected or substitute drawings were received on April 3, 2001. These drawings are not acceptable.

The new drawings are a substantial improvement over those originally filed, however they still have many objectionable errors and require corrections. The following objections to the drawings refer to the new drawings received on April 3, 2001 and not those originally filed and for purposes of examination the new drawings were relied on, however the applicant is required to further refine the new drawings to remove the following errors and any other errors that the applicant may be aware of.

2. Figure 28 and 32 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). **A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.**

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: There are no figures 28 A & B and 29 A & B. **A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.**

Art Unit: 2851

The specification describes figures 29 A & B and 28 A & B however only figure 29 and 28 singularly are present. There are no "A" or "B" labels present in either figures 29 or 28.

4. The drawings are objected to because Figure 24 has several boxes without reference numbers or any sort of label at all. **A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.**

Specification

5. The substitute specification filed on July 31, 2001 has been entered, though it contains some errors as described below.
6. The abstract of the disclosure as amended in preliminary amendment A received on July 31, 2001 is objected to because it is one long sentence and too long. Correction is required. See MPEP § 608.01(b).
7. The disclosure is objected to because of the following informalities: minor grammatical errors.

Appropriate correction is required.

Art Unit: 2851

For example page 25 line 24 reads "the for measuring". There are other errors of this nature that need correcting.

8. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 4, 5, 13, 14, 15, 16 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification does not teach what exactly the two dimensional information is that is obtained, for example claim 4 claims that it is its distribution along an optical axis and a scan direction of the laser beam, while figure 8b (which the specification states is two dimensional information) shows it to be containment size versus quantity. The claim language and the specification language make it difficult to understand exactly what the two dimensions exactly are. Further one with ordinary skill in the art would not necessarily know how the optical axis would differ from the scan direction of the laser beam. Since these claims are entirely unclear and are not supported in such a way to make a definitive rejection they will

Art Unit: 2851

not be further searched or treated with prior art. Claims 5 and 14 are dependent on claims 4 and 13 respectively so they are also rejected and will also likewise not be further treated, further the term optical axis is also not supported by the specification and there can be some confusion as to how that would differ from that of the scan direction of the laser beam. Claims 15 and 16 are also dependent on claim 13, the matter of claim 13 will not be further treated, however it should be noted that the prior art does teach displaying the information obtained by scanning on a monitor and information being obtained by the detected back scattered light from the fine particles.

Upon traversing this rejection or correcting the claim language, the examiner requests that the applicant examine the prior art of record for pertinent prior art that teaches along the lines of the intention of these claims. The prior art reference used in the below 35 USC 102e rejection: Nakata et al. (US 6,355,570) appears to use a similar scanning system to the specified invention and therefore most likely does obtain two dimensional distribution information as nearly as can be understood by the examiner, however since it is not specifically referenced as such in the Nakata reference and since the current specification does not enable the claim language for the two dimensional distribution, the examiner was unable to specifically apply the Nakata references, given that the examiner did not know specifically what property of the Nakata reference taught the two dimensional distribution. Therefore no prior art reference was cited. If the applicant overcomes or traverses the 35 USC 112 rejection, the examiner requests also that they explain how these claims read over the Nakata reference as well.

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

12. Claims 1-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors.

For example claim 1 reads in part "scanning a laser beam which intensity is modulated at a desired frequency inside the processing chamber where the semiconductor device is being processed by the plasma through a window". A possible suggestion for rewriting this is: "scanning a laser beam through a window into the processing chamber where the semiconductor device is being processed by the plasma, wherein the laser beam's intensity is modulated at a desired frequency."

For purposes of the prior art rejection(s) the examiner will make similar analysis/assumptions as done just now above of what the proper meaning of the claims probably was meant to be.

Nakata does not teach the window having a Brewster's angle relative to the P-polarized laser beam and therefore claim 3 upon correcting the grammatical errors of it and its dependent base

Art Unit: 2851

claim and re-writing it in independent form including the matter of claim 1 would be allowable over Nakata et al.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

14. Claims 1, 2, 6-12, and 17-23 is rejected under 35 U.S.C. 102(e) as being anticipated by Nakata et al. (US 6,355,570)

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Nakata et al. teaches in columns 6 a method of processing a semiconductor device, which comprises the steps of generating a plasma in a processing chamber (lines 3-6) to form a thin film on a semiconductor device or to process a thin film formed on a semiconductor device (lines 5-8); scanning a laser beam through a window (column 5 lines 35-38) into the processing chamber where the semiconductor device is being processed by the plasma, wherein the laser

Art Unit: 2851

beam's intensity is modulated at a desired frequency (a first light at a first wavelength and intensity at a desired frequency lines 9-12) as is also claimed by applicant's claim 18; receiving by a sensor through the window a back scattered light being scattered from fine particles suspended in the processing chamber by scanning the laser (first scattered-light detecting optical system lines 12-24); detecting the desired frequency component from a signal outputted from the sensor (lines 12-24); obtaining information from the detected desired frequency component relating to quantity, size and distribution of the fine particles illuminated by the laser beam inside the processing chamber and outputting the obtained information (see figure 2 where information is outputted to a display) relating to quantity size and distribution of the fine particles as is claimed by applicant's claim 19, 20, 22, and 23 (Nakata and the present application both teach these particles are contamination). Nakata teaches in figure 2 that the information obtained is outputted to a monitor (display 35) as is claimed in applicant's claim 21.

Nakata teaches in column 6 lines 9-15 that the laser beam (first light) has a desired wavelength component and that desired wavelength component is received by the sensor separated from other wavelength components in the step of receiving the back scattered light as is nearly can be understood is claimed by applicant's claim 2.

With regards to applicant's claim 6, Nakata teaches in column 9 lines 24-51 that the plasma is modulated at a frequency at 800 kHz where as in column 10 lines 37-45 the laser is modulate at a frequency of 170 kHz as is believed claimed by applicant's claim 6.

With regards to applicant's claims 7-17, Nakata teaches in column 22, a method for processing a semiconductor device, which additionally (in addition to the steps above) includes coating a resist on a surface of a substrate (lines 16 - 19). Then the resist is exposed with a

Art Unit: 2851

desired light pattern of one sort or another and then developed (lines 29-32.) The substrate is then processed with plasma and the surface of the substrate is partially covered with resist and then the resist is removed from the substrate on which the patterns are formed (lines 37-40 and as nearly as can be understood from applicant's claim language.) As taught above Nakata further teaches in column 6 that during the processing step, the processing apparatus is scanned through a window by a laser beam, wherein the laser beam's intensity is modulated at a desired frequency (a first light at a first wavelength and intensity at a desired frequency lines 9-12) as is claimed by applicant's claims 7, 9, and 11. Nakata teaches that a sensor receives through the window a back scattered light being scattered from fine particles suspended in the processing chamber by scanning the laser (first scattered-light detecting optical system lines 12-24 as is believed claimed by applicant's claim 8) and detects the desired frequency component from a signal outputted from the sensor (lines 12-24) by which it obtains information from the detected desired frequency component relating to quantity, size and distribution of the fine particles illuminated by the laser beam inside the processing chamber as is claimed by applicants claim 12. By filtering the polarization and angle light reflected from the wall of the plasma etching apparatus is eliminated as is claimed by applicant's claim 10 (col. 12 lines 18-27.) This data is then outputted to an external device such as a display (see figure 2 where information is outputted to a display.)

With regards to applicant's claim 17 all other parts of the method are the same as above except, applicant's claim 17 claims the details of producing the plasma. Nakata teaches this method in column 9 lines 24-52. The steps consist of loading a substrate into a chamber of a plasma etching apparatus. A resist pattern is formed on the surface of the substrate (explained

Art Unit: 2851

elsewhere and in more detail above). The chamber is evacuated and a gas is provided into the chamber (line 32.) A high frequency power is applied to an electrode of the plasma etching apparatus and plasma is generated inside the chamber (line 34-44). All else is described above and the dependent claims have been rejected above.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 5,943,130 to Bonin et al. also teaches a semiconductor device manufacturing method/system (the method of manufacturing a semiconductor using a device is obvious) where a laser beam is shined into a reaction chamber to detect contaminants/particles.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew T Sever whose telephone number is 703-305-4036. The examiner can normally be reached M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russell Adams can be reached at 703-308-2847. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Application/Control Number: 09/760,704
Art Unit: 2851

Page 11

AS
April 11, 2003

A handwritten signature in cursive script, appearing to read "Russell Adams".

RUSSELL ADAMS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800